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# Artistic Participatory Video-Making for Science Engagement

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## ABSTRACT

This paper uses theatre to frame reflexive discussions on the use of participatory video making for science engagement. The ‘JuxtaLearn’ research project is presented as a case-study that focuses on performance concepts such as audience, purpose, improvisation or final production as a lens for supporting technology-enabled creative exploration. Three different approaches were taken to creative participatory video making processes: co-creation by learners, as a communication tool for researchers and as a public engagement tool. Differing expectations about the timing and aim of the research process created considerable debate among the research team regarding the control of and purpose of filmmaking. It was not the topic of debate within the film that was deemed controversial, but more who, when and in what ways these debates occurred. Theatrical and HCI concepts of audience, performance ownership, improvisation and storyboarding, boundary object creation, participation and boundary creatures are foci of debate within the project.

## Author Keywords

Technology-enhanced learning; performance; mobile learning; boundary objects; device ecology; identities.

## ACM Classification Keywords

H.5.1 Multimedia Information Systems (multimedia; audio input/output); H.5.3 Group and Organization Interfaces (asynchronous interaction; synchronous interaction; computer-supported cooperative work).

## INTRODUCTION

This paper reviews how theatre can provide a focus for participatory video-making within, through and from HCI in science interpretations. The paper is a case-study of the ‘Juxtalearn’ ([www.juxtalearn.org/](http://www.juxtalearn.org/)) project, which aims to increase participants’ engagement with science through juxtaposed creative participatory video-making. In Juxtalearn, school students have created artistic interpretations of science concepts and turned these into media objects for sharing. These creations are used as

boundary objects to stimulate debate via presentation on large-screen public displays and through online commenting. Video-making has also been used to share understanding among the project partners. However, the use of creative approaches to engage citizens, early in the project, has uncovered issues among the research partners regarding the acceptability of this approach. This paper presents how theatrical thinking can inspire HCI innovations whilst uncovering research assumptions.

## THEATRE AND HCI

Theatre has long understood the art of facilitating engagement and interaction. For example, Music hall (vaudeville) and in the UK, pantomime, use audience participation during the production, encouraging the audience to ‘shout out’ and ‘come on stage’ during the performance. Early cinema retained elements of this interactivity, using musicians to accompany silent movies and audience sing-alongs. However, with the advent of talkies and TV, audience participation decreased. Modern media are revitalizing audience participation, for example YouTube audience comments and creators’ responses, while TV programs use social media conversations to support audience feedback. However, few of these modern approaches come close to the innovation in social engagement that was reviewed by theatrical theorists in the early twentieth century.

Bertolt Brecht believed that audiences should intellectually interact with a piece of theatre, to develop their minds; emotions were held to detract from the purist elements of the experience. This reflects the origins of HCI in psychology and scientific principles, where objectivity rather than subjective experience governed research and interaction design. The surrealist, Antonin Artaud, in contrast to Brecht, believed that theatre should be driven by sensory and emotional experiences. Theatre, he believed, should be like a religious or a sporting event, providing an all-encompassing experience that transcended language barriers. It could be argued that recent focus in HCI on experience design [2] and evocative computing [11] reflects this move towards Artaudian approaches.

These approaches focus on audience participation during the performance. However, there has been research into

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different participations during the artistic creation process. In the theatre, Mike Leigh famously developed the script for his 1977 play, *Abigail's Party*, through lengthy improvisations that allowed the actors to explore the characters and their interactions. HCI improvisation researchers [12] noted the importance of designing for different forms of engagement in the artistic artifact. This links to game-based interactions that allow the player to interact not only as audience but also as co-creator of the experience. Laurel [6] detailed the use of a theatre metaphor to support innovative approaches to game design developments. These approaches focus on the artistic creation as a co-created boundary object.

### DIGITAL BOUNDARY OBJECTS & CREATURES

Boundary objects can both transcend and present barriers to understanding. Levina & Vaast [7] identified the categories of **Boundary objects-in-use** which arise informally, when different parties develop something that is shared with others as a means to exchange knowledge. Boundary objects-in-use are useful in more than one field and acquire a common identity as they are shared.

Dindler et al [3] have reviewed the use of shared digital media and video for science learning requirements-gathering, framed by the shared narrative highlighting the benefits of playfully inspiring children and designers. This concept of a boundary object focuses on sharing via 'performance' and different modes of interacting with a narrative. However, it also uses the process as a creative expression of the self. Technologies can facilitate sharing the narrative if it is able to cross community and social norm boundaries whilst preserving the personalised stamp of the individual. Within a theatrical performance, the director facilitates the enactment of the narrative with characters. Within a HCI research process, the researcher facilitates engagement with communities and citizens.

Digital media change the roles of researchers, and can provide a means for a more dialogic relationship with citizens in the research process. However, there are strong political implications from this participation [8]. The role of social structures and researchers' identities is a growing field of interest for HCI designers. Adams, et al., [1] reviewed the concept of researchers as intermediaries; as 'boundary creatures' moving among different communities of practice. When viewing an artistic process through a performance lens, we should consider, not just artifacts, but also the audience, the participation process and the researcher's role in this process.

### SCIENCE ENGAGEMENT AND SOCIAL ACTION

Around the world, not enough young people take science or technology at school and university, once it ceases to be compulsory. Simultaneously, many internationally bodies supported the strengthening of high-quality engagement with the public on major science issues.

Valtysson [13] highlights the role of digital media in engaging citizens in social and political action. However,

there are engagement barriers to these processes, as the design of these interactions often gives implicit ownership to academics and researchers. Koltay [5] notes the importance of fully understanding digital literacies and power systems within citizen engagement processes. In contrast, Petray [10], presents the potential researcher role through the digital media as an 'activist researcher'. In this approach, social action is central to the research, actively seeking to change citizens through events, activities and artistic practices. This highlights two debates in participation politics; the participation process and the researcher's role in socially engaged research [8].

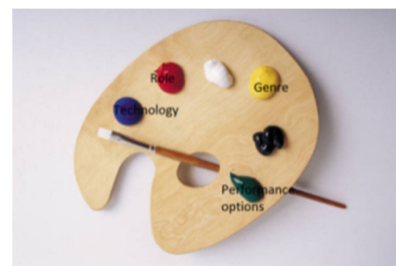
Participation requires responsibility, hands-on activities and relationships [4]. It is not about imparting facts but rather giving agency to participants, starting thinking that challenges values and changes people. Within a theatrical frame, participants, by representing their message together, are allowed to solve problems in a different, perhaps more open, manner. Problem-solving techniques include improvisation that socially engages specific communities.

### METHODOLOGIES

The following details unpick the 'performance' foci that guided not only the system development but also participatory video and engagement processes.

#### Creative Learning Performances

A 'performance' approach was used to provoke students' curiosity and understanding through artistic participatory video-making about concepts in science and technology. A performance palette is being developed that supports, within the Juxtalearn process, an artistic approach to inspire video creators to juxtapose concepts. Colours within this palette focus on juxtaposed inspirations, such as genre (see Figure 1). For example looking at the biological concept of immunity through the genre of the 'Western' could inspire the use of white-hatted cowboys to represent white blood cells.



**Figure 1:** Inspiring a juxtaposed science performance

Mobile technologies (data-pens, phones, tablets, cameras) and in-situ systems and processes (tabletops, public displays, learning analytics) are being used to support artistic performances, through film-making and editing, then sharing and debating the performances, to produce ever-increasing circles of curiosity. Key to this conceptual development is focusing on 'artistic interpretations' in learning through performance (Figure 2).



**Figure 2: From storyboard to film production**

Studies have been completed in Milton Keynes, UK; Madrid, Spain; Vaxjo, Sweden; and Portugal. The performance metaphor has also been used to guide international partner collaborations and public engagement with the project.

### FINDINGS

The findings identified three issues uncovered by a ‘performance’ approach to artistic interpretations in engagement: Ownership and Identity, Enhanced Understanding, Timing of Engagement

#### Ownership, Identity and creative expression

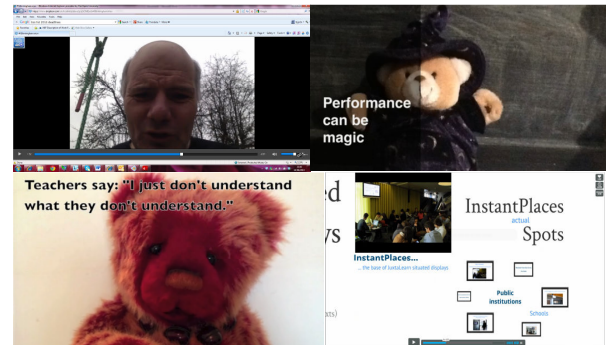
JuxtaLearn seeks to use the concept of performance to support ownership of the learning experience and the move between personal and shared experiences. Initial findings have identified performance as a powerful form of narrative that binds conceptual understanding whilst motivating engagement for reflection and sharing understanding. However, we have encountered varying beliefs about when a performance is ready to be shared. Paper storyboards (Figure 2) are concrete objects that make the participatory video-making processes visible. This is partly because moving paper physically around the classroom makes the students and teachers aware of who is sharing what with whom. These objects are associable, that is, related to shared attributes that cross boundaries and allow creativity [9]. However, when objects are about to become public, awareness decreases and concepts of ownership increase. Interestingly, the students were very happy to share their creations internationally. They perceived commenting, discussions and public debate as more threatening.

The artistic approach taken to ‘juxtaposing’ and debating conceptual understanding was considered empowering by both student and academic creators. However, traditional concepts of ‘performance’ restricted sharing practices. This was particularly evident in the notion of film-making, where some expected Hollywood or BBC levels of creativity and accuracy. Within HCI there is a growing understanding that there are multiple levels of performance; consider the shift between narratives in a blog compared to a peer-reviewed journal. Ultimately, we must design systems adaptable to artistic interpretations that change and

extend creators’ identities and roles as they move between personal and shared performances.

#### Enhancing Partner Understanding in Design Debates

Video, and specifically the process of performance, was used during the Juxtalearn project to support designer and researcher communications. Partners created exemplar videos to test performance processes and communicate perspectives. It was invaluable for partners to view and reflect on the different approaches that designers took to the creative video-making process (Figure 3).



**Figure 3: Design partners create a video performance to communicate design decisions**

While some used creative technical devices, others focused on live interactions and juxtaposed contexts to create understanding. Some researchers used humour to engage their audience and initiate debates through juxtaposed understanding; others used the context to creatively juxtapose. A simple camera carried on a swing representing how the process of video-making can distract from the topic of discussion, highlighted the issue of disruptive elements in the film-making process. The resources and devices being developed for the project system were used by the team for their video-making, including pencasts, storyboarding, tablets and apps. This supported rapid prototyping of the whole system.

#### Timing in Engaging Citizens in Creative Debates

The ‘Juxtalearn’ project is seeking to use a performance approach in its social engagement. To develop this, we needed an understanding of who the audience was and how to creatively engage them. Various public engagement tools were used to spark discussion, for example the Science for All conversational tool<sup>1</sup>, the NCCPE’s<sup>2</sup> Edge Tool for engagement in the research cycle. Social media approaches were also used to guide engagement, for example, with Influence Ripples<sup>3</sup>. This

<sup>1</sup> <http://www.britishecienceassociation.org/sites/default/files/root/SIS/PE%20conversational%20tool%20Final%20251010.pdf>

<sup>2</sup> <http://www.publicengagement.ac.uk/>

<sup>3</sup> <http://www.searchenginepeople.com/blog/authority-spheres-of-influence-and-influence-ripples.html#ixzz2LMtQhn9I>

model focuses not only on identifying key stakeholders but also on understanding their relationship.

Project partners were positive about publishing, socially engaging and co-creating with project communities. However, there was a tendency to focus on transmission, rather than on wider co-creation of social agendas. Central to the debate was the point in a research project at which public engagement could most effectively occur, focusing on engagement near the end of a project. Objections centered on practicalities ('we need to know what we're discussing before we debate it in wider forums') and on politics- and esteem-related issues. Issues also arose from restrictions in the funders' evaluation procedures. Early engagement, to co-create a research agenda, can fundamentally change research questions. While researchers may accept this, funders may not have the flexibility to change direction. Ultimately this restricts the impact that citizens can have on research aims and objectives. It could be argued that a central debate for HCI researchers should consider how funding bodies' review procedures can enable citizens' engagement throughout projects.

## CONCLUSION

This paper presents a case-study on technology-enhanced learning that has used artistic approaches to participatory video-making. Three 'Performance' approaches were taken: to enhance students science engagement and learning, to support partners' creative design processes, to support public engagement. Some intriguing questions and tensions have emerged:

- When is the creation ready to share?
- Who is the audience?
- In what ways and at what points in the process do we engage with the audience?

The project triggered debates about what constitutes a final 'sharing-ready' performance and who makes the decision to share. There have also been ongoing discussions about who should comprise the audience. The concept of co-creating a performance as a theatrical improvisation with the audience while also engaging is less acceptable to creators (both students and academics). Through reflexive discussions, researchers have become more pro-active about their role in supporting and defining the creative process. The project has changed focus away from boundary objects to the process and boundary creature that support that process.

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